

FISH PASSAGE IMPROVEMENT AND COORDINATION

Job Progress Report

Project AFS-2

(An Anadromous Fish Conservation Act funded,
U.S. Fish and wildlife administered project)

Subproject I. Interagency Coordination of Fish Passage
Requirements

Subproject II. Fish Transportation Oversight

Period Covered: March 1, 1987 to February 29, 1988

by
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May, 1988

JOB PROGRESS REPORT

State of: Idaho Title: Interagency Coordination
of Fish Passage
Project No.: AFS-2 & AFS-2-1 Requirements
Subproject No.: 1

Period Covered: March 1, 1987 to February 29, 1988

OBJECTIVES

To provide expertise on matters of anadromous fish passage to working committees involved with fish passage in the Columbia and Snake rivers as well as effectuate interagency coordination of matters regarding anadromous fish passage in the Columbia River basin.

PROCEDURES

A fish passage specialist was assigned to six working committees that are responsible to the state and federal fishery agencies for the development and oversight of fish passage operating criteria and plans. This specialist, representing Idaho Department of Fish and Game (IDFG), was a member of the following committees:

1. The Fish Passage Advisory Committee of the Columbia Basin Fish and Wildlife Authority (CBFWA).
2. The Technical Coordinating Committee of the Corps of Engineers (COE) Fish Passage Development and Evaluation Program (FPDEP).
3. The following TCC-FPDEP subcommittees:
 - a. The Research Needs and Priorities Subcommittee (ARNPS);
 - b. The Fish Research Scientific Review Subcommittee (FRSRS);
 - c. Adult Fish Counting Subcommittee (AFCS); and
 - d. The Fish Facility Design Review Subcommittee (FFDRS).

RESULTS

Fish Passage Advisory Committee Participation

The anadromous Fish Passage Advisory Committee (FPAC) is established under the CBFWA to coordinate and develop technical and policy analyses and recommendations under Authority policies and direction. FPAC is composed of two standing committees: 1) the Fish Passage Advisory Committee and 2) the Anadromous Fish Passage

Committee. Committee responsibilities include coordination of technical and policy analyses and development of technical and policy recommendations relative to dam operations and water management affecting fish passage on the mainstem of the Columbia and Snake rivers. FPAC also reviews and comments on all major reports, plans and analyses prepared by the Fish Passage Center (FPC) and responds to technical questions from the Water Budget Managers and the Executive Group of the CBFWA. The FPAC coordinates and provides oversight review of research planning and development by the Power Planning Council's Water Budget Effectiveness and Reservoir Mortality Technical Work Group and the COE's FPDEP-TCC and its subcommittees. Members of the FPAC have the following objectives and duties:

A. To coordinate analyses of member entity representatives on technical aspects and matters of policy relative to dam operations and water management within the Columbia Basin relating to:

1. Adult anadromous fish migration

- (a) Design and operation of adult passage facilities, including development and periodic revision of basic operations standards.
- (b) Spillway, powerhouse and other operations as they affect adult migration.

2. Juvenile anadromous fish migration

- (a) Reservoir impacts on anadromous fish.
- (b) Water budget and other mainstem migration flows and spills, and development of annual Detailed Fishery Operating Plan (DFOP).
- (c) Juvenile fish transportation.
- (d) Design and operation of juvenile bypass facilities to include development and annual revision of basic operating standards.
- (e) Spillway operations affecting juvenile survival.
- (f) Coordination of flows and hatchery releases.

B. To provide technical guidance to the Water Budget Manager; to monitor the manager's work and report periodically to the Council.

Members of the FPC meet regularly each month and address agenda items which pertain to both adult and juvenile passage at the Columbia Basin's mainstem hydroelectric dams. The following nine agencies and tribal organizations are represented:

- 1. U.S. Fish and Wildlife Service (USFWS)
- 2. National Marine Fisheries Service (NMFS)
- 3. Idaho Department of Fish and Game (IDFG)
- 4. Oregon Department of Fish and Wildlife (ODFW)

5. Washington Department of Fisheries (WDF)
6. Washington Department of Wildlife (WDW)
7. Columbia River Intertribal Fish Commission (CRITFC)
8. Representatives from the 14 governing bodies of the Treaty Tribes
9. Water Budget Mangers of the FPC

The meetings of the FPAC occur monthly, and usually are held in Portland, OR. Field meetings are occasionally held when direct observation of fish passage related matter is necessary. During the period March 1, 1987 and February 29, 1988, I attended 12 FPAC meetings. In addition, I was elected and served as the committee's chairman during the 1987 calendar year. All but two of the meetings were held in the Portland office of the National Marine Fisheries Service (NMFS). FPAC met during March, 1987 at the Washington Department of Fisheries office in Tumwater, WA. In May, the committee visited Lower Granite Dam to observe the U. of I. conducted "open flume" research operations. The regular FPAC meeting was held at the IDFG Regional Office in Lewiston, ID.

The 1987-88 report period was an exceptionally active session for the FPAC. With the formation of the new CBWFA, new committee charters were required and members of FPAC were involved in recommending and adopting new committee language. Members of FPAC were also very active in the formation and assigned tasks of the NPPC's Technical Work Group on Water Budget Effectiveness and Reservoir Mortality. Although all FPAC members were not assigned to the TWG, the TWG received guidance and oversight from the Committee. Other agenda items covered during the 12 monthly meetings were too numerous to cover individually in this document. However, I will mention some of the more important topics the FPAC handled during the report period.

FTOT's Annual Work Plan

As described in previous reports, the Fish Transport Oversight Team (FTOT) functions as a subcommittee of FPAC, and we review and secure agency and tribal (A/T) approval of the FTOT Annual Work Plan. We began reviewing the 1988 draft Work Plan at the November FPAC meeting and had secured A/T and COE agreement on proposed changes by the January, 1988 TCC-FPDEP meeting. Several key changes were implemented:

1. Submerged traveling screen (STS) video inspection schedules at McNary Dam were modified. Two units per week will be inspected during April and three units between the period May through July. Beginning in August, the frequency falls back to two units per week.
2. The summer transport termination criteria was modified at McNary's collection facility. Transport will continue until numbers of fish collected are 1,000 or less for five consecutive days (approximately Sept. 30).

3. The juvenile sampling criteria were modified at Lower Granite and McNary Dams to help provide enough juvenile migrants for previously-approved numbers of markable fish to conduct transport evaluation and PIT tag studies.

The 1988 draft FTOT Work Plan was passed on to the CBFWA's Executive Group in February, 1988.

The FTOT Annual work Plan is a "working document" which describes operations and establishes criteria for the transportation of juvenile migrants at Lower Granite, Little Goose and McNary dams. The work plan provides for cooperative management between the fishery agencies and the Walla Walla District, Corps of Engineers (NPW). Its overall goal is to transport juveniles within established guidelines and maximize survival of fish collected and transported. The objectives of the FTOT Annual Work Plan are as follows:

1. Provide efficient collection and safe barge or truck transport of Juvenile salmonids from collector dams to their release points below Bonneville Dam.
2. Inspections prior to, during and after the juvenile migration season will be conducted by FTOT, project, state and tribal biologists. These inspections should ensure facility readiness and operation at established criteria as well as determining maintenance requirements for the following season.
3. Identify and recommend any changes which would be beneficial to fish collection and transport operations and/or bypass systems as related to transportation.
4. Ensure that collection, transport and release site facilities will be ready for operation prior to the spring juvenile outmigration (April 1, 1988).
5. Follow operating criteria established for facilities, barges and trucks. Criteria will be updated to maintain standards for holding fish, i.e., fish densities, sampling and facility operation and maintenance. The FTOT will monitor and coordinate changes during the transport season.
6. Coordinate evaluation of the transportation program for 1988.
7. Training of new personnel associated with collection and transport facilities.
8. Preparation of an annual report detailing the past year's transportation effort.

1988 Water Budget Implementation

The 1988 runoff in the Columbia River basin (January-July volume) was only 53% of average in the lower Snake and 78% of average in the mid-Columbia, resulting in 71% of normal in the lower Columbia. Because of the critically low flows during the 1987 Juvenile migration, the concept of the Water Budget (WB) was severely tested for the first time since its conception in 1983. The FPAC was actively involved, along with the Water Budget managers, in implementing the flow augmentations requested for improved Juvenile survival. The WB implementation began with several discussions among the fish passage managers and the fishery agencies/tribes through the monthly meetings of the FPAC, and then as the migration season progressed, coordination took place on an almost daily basis (conference call format). Since the critically low runoff forecast limited the total WB volume in the Snake River (estimated 8 to 11 days), the committee decided that the WB request should be used to produce flow spikes when fish were in the Lower Granite reservoir. The FPC eventually submitted three WB augmentation requests (May 6-8 and again for May 11-13. The final WB request took place on May 15-17) on the Snake River. By May 17, all of the WB allocation from Brownlee and Dworshak had been utilized, for a total of nine days (439,000 af).

The mid-Columbia WB requests were made in late May and continued into early June (26 May through June 10). The requests were based on low forecasts for the Snake River, increasing water temperatures, and John Day passage concerns. Again, the requests were discussed with the WB managers and A/T biologists (FPAC). The 16-day flow augmentation amounted to 2.52 MAF from Grand Coulee storage.

Other FPAC Activities and Coordination

In addition to the above-mentioned areas, FPAC members took action on or discussed the following topics during the 1987-88 reporting period:

1. Reviewed and commented on FPC reports on 1987 Smolt Monitoring Program and 1987 Fish Passage Managers Annual Report.
2. Spring chinook sampling requirements for juvenile transport research at Lower Granite Dam.
3. Coordination, planning and agenda for aservoir Mortality workshop.
4. Review of COE's 1987 Juvenile Fish Passage Plan.
5. Preparation of the Authority's Detailed Fishery Operating Plan (DFOP) for 1987.
6. Review of BPA's report, Juvenile Fish Transport Strategies.

7. Bonneville II Powerhouse Survival Study.
8. COE dredging activities at Schultz Bar and Lower Granite Reservoir.
9. Shad passage and adult counting at Priest Rapids Dam.
10. Low flow impacts on NMFS juvenile transport research.
11. Review draft, 1988 WB Measures Program.
12. Review of COE's FPDEP Research Reports.
13. McNary Dam's fishway operations.
14. Bonneville Dam lamprey trapping.
15. A/T proposal to improve COE's, FPDEP Program.
16. Establishment of PIT Tag Technical Committee.
17. Mainstem juvenile bypass funding and completion schedules.
18. PIT tag detector system installation at Bonneville Dam fishway.
19. Review of Idaho's Smolt Monitoring (BPA) research.

FPDEP-TCC Activities

The Fish Passage Development and Evaluation Program is a Corps of Engineers (North Pacific Division) function that deals with both research and operational programs at Corps projects. Basically, the FPDEP's Technical Coordinating Committee is made up of fishery biologists from the COE-NDP (Walla and Portland Districts, NPW and NPP) and FPAC representatives. Together we help the COE deal with fishery research needs, and to some extent, operational programs at Corps projects. In a lesser function, FPDEP serves as a communications forum between the fishery A/T's and the Corps.

There are normally bi-monthly meetings of the FPDEP-TCC, regularly occurring on the same days as FPC meetings in Portland, OR. During the period March, 1987, through February, 1988, I attended eight FPDEP-TCC meetings. Some of the major topics that were considered at the 1987-88 meetings were:

1. Agreement between A/T and COE for 1988 FTOT work Plan.
2. Lower Granite dredging window modification.
3. A/T recommendations to improve FPDEP.

4. Update on Little Goose Dam's juvenile holding and loading facility.
5. Status of adult fish bypass facility modifications at Lower Snake projects.
6. FPDEP 5-Year Research Plan.
7. Water Budget Forecast Updates for 1987 juvenile migration.
8. Hydroacoustic monitoring at John Day and Lower Monumental Dams.
9. Spring chinook BKD-Transport Research.
10. McNary's north fishway collapse (winter 1987-88) and repair.
11. Bonneville II Survival and Forebay Distribution Research.
12. Results of "open flume" testing at Lower Granite Dam.
13. A/T concerns about final review of the FPDEP research program.
14. Research results from 1987 field work at COE, mainstem projects (FGE work).
15. Summer spill programs at The Dalles, John Day and Lower Monumental dams.

FRSRS Subcommittee Activities

The Fish Research Scientific Review Subcommittee (FRSRS) is a subcommittee of FPDEP functioning to determine whether the experimental designs submitted to the Corps meet predetermined research objectives. Research proposals are examined closely to see if they are scientifically capable of meeting those objectives and that results will be biologically sound and statistically valid.

The subcommittee meets in July to review preliminary proposals and again in October-November to review detailed study plans and as necessary to review results. Items such as coordination, statistical analysis and numbers of fish to be handled and/or sacrificed are important elements in the subcommittee review process. Representatives on the FRSRS are:

- | | |
|----------------------|-----------|
| 1. IDFG | 6. WDW |
| 2. NMFS/NWAC | 7. ODFW |
| 3. NMFS/CZES | 8. CRITFC |
| 4. COE (NPW and NPP) | 9. USFWS |
| 5. WDF | |

During the summer FRSRS meeting held in Seattle, WA (July 1987) we discussed eleven separate research proposals. Three were eliminated through project termination or other source funding (BPA) options. The subcommittee met for the second time during the fall (November 4-5) and reviewed eight modified proposals (Appendix I).

AFNPS Activities

The Research Needs and Priorities Subcommittee (AFNPS) met much more frequently during the 1987-88 report period. The subcommittee's primary responsibility is to produce a Five-year Research Program and to prioritize those projects for individual fiscal year funding allotments. Because of A/T recommendations to modify the FPDEP process, especially in respect to funding approval for research, additional AFNPS meetings were held to try and reconcile differences between the COE and A/T representatives. During 1987-88, the subcommittee met a total of six times in an attempt to come to an agreement on FPDEP policy issues (research priority, funding selection and A/T review of final COE recommendations) but failed to reach a settlement. Progress was made, however, in developing a joint A/T and COE approved research ranking process.

At the February 24, 1988 AFNPS meeting, the A/T representative indicated that their members would no longer attend Research Needs Subcommittee meetings until the A/T concerns over the FPDEP process are resolved (Appendix II).

JOB PROGRESS REPORT

State of: Idaho Title: Fish Transportation Oversight
Project No.: AFS-2 & AFS-2-1
Subproject No.: II

Period Covered: March 1, 1987 to February 29, 1988

OBJECTIVES

To provide direction, coordination and oversight of the anadromous smolt collection and transportation program on the lower Snake and Columbia rivers.

PROCEDURES

Idaho Department of Fish and Game (IDFG) will assign a fish passage specialist to be a member of the Fish Transportation Oversight Team (FTOT). This team is a subcommittee of the Columbia Basin Fish and Wildlife Council's Anadromous Fish passage Committee and provides planning and coordination by the fishery agencies, Corps of Engineers and Indian tribes, as well as direct inspection and oversight of quality control in the smolt handling process at the dams.

RESULTS

I represented the IDFG on FTOT during the 1987 transport season. However, since I was also serving as chairman of the CBFWA's FPAC, I stepped down as FTOT chairman. In 1987, FTOT continued to manage the Juvenile transport program and provided coordination between Walla Walla District, Corps of Engineers (NPW), fisheries agencies and tribes. The FTOT was composed of biologists from the National Marine Fisheries Service (NMFS), IDFG, Columbia River Intertribal Fish Commission (CRITFC) and NPW.

The FTOT's goal is to maximize survival of Snake and Columbia River salmonids by improving collection, transport and bypass conditions for juvenile migrants. Responsibilities include providing coordination; biological and program oversight; developing an annual work plan; conducting on-site inspections of collection and transport facilities prior to, during and after the season; and producing an annual report summarizing transport activities. A meeting is hosted by FTOT each summer for program participants and other interested individuals to discuss current season's operations and recommend program and facility modifications for the following year. The 1988 FTOT Work Plan appears as Appendix III.

Additional biological oversight is provided by cooperative agreements between NPW and the states of Idaho, Oregon and Washington. Under these cooperative agreements, NPW funds state fishery biologists at each transport project. Idaho's representatives were assigned to Lower Granite, Oregon's to Little Goose and Washington's to McNary. Work loads were shared by NPW's project biologists and state biologists. I reviewed the contract for the cooperative agreement between IDFG and NPW for the 1987 transport season and helped negotiate the budget with NPW staff for the Lower Granite biological oversight. In addition, I directly supervised the State of Idaho's biologists which were assigned to the Lower Granite collection/transport project. I assisted the biologists with preparation of a 1987 Project Summary Report.

During 1987, juvenile salmonids were collected and transported from the Snake River at Lower Granite (River Mile (RM) 107.5) and Little Goose (RM 70.3) dams and from the Columbia River at McNary Dam (RM 292). The Snake River, a major tributary of the Columbia River, joins at RM 324.3. Collected smolts were transported below Bonneville Dam (RM 146.1) via truck or barge and released into the river. Transported smolts bypassed four to eight dams and 146 to 280 miles of impounded river.

Rather than detail the 1987 juvenile transport season in this progress report, the FTOT's Fish Transportation Oversight Team Annual Report-FY 1987 (Koski et al) should be reviewed as a supporting document.

This report summarizes the 1987 transport season which commenced March 27 and ended on October 29. A total of 19,821,789 smolts were collected including 5,512,412 at Lower Granite, 1,983,321 at Little Goose and 12,326,034 at McNary. Total collection included 2,345,147 and 50,740 smolts bypassed at McNary and Little Goose, respectively.

A total of 17,036,5665 juvenile salmonids were transported to below Bonneville with Lower Granite accounting for 5,470,751, Little Goose 1,910,026 and McNary 9,655,789. Barge transport accounted for 15,355,130 and trucking for 1,681,436.

A P P E N D I C E S



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
 NATIONAL MARINE FISHERIES SERVICE

Northwest & Alaska Fisheries Center
 Coastal Zone & Estuarine Studies Division
 2725 Montlake Boulevard East
 Seattle, Washington 98112

December 1, 1987

F/NWC5:GEM

MEMORANDUM FOR: Art Gerlach, Chief, Environmental Resource
 Branch, NPD, U.S. Army Corps of Engineers

FROM: *[Signature]* Gerald Monan, Chairman, Fish Research Scientific
 Review Subcommittee (FRSRS)

SUBJECT: Minutes of FRSRS, November 4 and 5, 1987

The meeting was convened at the Northwest and Alaska Fisheries Center in Seattle, Washington, at 1015 hours, 4 November 1987. The following individuals were in attendance during all or part of the meeting:

*Doug Arndt	COE	*Phil Mundy	CRITFC
*Teri Barila	COE	*Bill Nelson	USFWS
Lyle Calvin	COE (Consultant)	Donn Park	NMFS
David Damkaer	NMFS	*Steve Pettit	IDFG
Earl Dawley	NMFS	Earl Prentice	NMFS
Wes Ebel	NMFS	Howard Raymond	NMFS
*John Ferguson	COE	Tom Ruehle	NMFS
Mike Gessel	NMFS	Lowell Stuehrenberg	NMFS
Al Giorgi	NMFS	Bob Vreeland	NMFS
Dale Johnson	BPA	Dave Ward	ODFW
Russell Kappenman	NMFS	John Williams	NMFS
R. Magne	COE	*Chuck Willis	ODFW
Gene Matthews	NMFS	*Rod Woodin	WDF
*Jerry Monan	NMFS		

*Members or alternate

The Chairman opened the meeting by announcing that Peter Hahn, Washington Department of Wildlife's (WDW) representative on the Committee, had called and said he would not be able to attend. This prompted comments by Committee members that full participation by the agencies would be appreciated and whenever



possible alternates should attend.

During the meeting there were eight separate proposals discussed, and a project leader for each proposal reviewed the proposal and answered questions. The proposals reviewed and the pertinent decisions made by the committee are as follows:

1. Evaluate im^proved collection, handling, and transport techniques designed to increase survival of juvenile salmon and steelhead--Donn Park

Doug Arndt opened the discussion by stating that the COE's position in relation to Task 1.1 [Mark (using coded wire tags), transport, and release test and control lots of juvenile chinook salmon and steelhead] is that unless controls were marked and released, the COE would probably not fund the study. The remark was prompted by a Fish Passage Advisory Committee (FPAC) directive that controls not be marked in a critically low-flow year. It was agreed that the 1 April 1988 water forecast would be a major consideration in this particular aspect of the study.

The majority of the discussion about Tasks 1.1 and 2.1 (Mark, transport, and release test and control lots of yearling and subyearling chinook salmon) was related to the adequacy of the marked sample sizes in relation to providing statistically sound data for management decisions. After considerable discussion, the Committee advised the researchers to work with Lyle Calvin, Russ Kappenman, FTOT, FPAC, and Teri Barila to work

out a series of scenarios incorporating various statistical schemes; degrees of confidence; appropriate sample sizes; and logistical, political, and biological constraints and present these to the mid-December meeting of the Fish Passage Development and Evaluation Program Technical Coordinating Committee for review, evaluation, and recommendations--Donn Park agreed.

The discussions concerning Task 1.2 [Mark (using PIT tags) spring and summer chinook salmon parr or presmolts at selected hatcheries and in selected natural/wild production areas] considered issues like how the proposed modifications to the Lower Granite Dam juvenile facilities would function (see Attachment 1), the number of non-PIT-tagged fish that would be returned to the river with PIT-tagged controls (see Attachment 2), the long term reliability of the PIT tag, and what can be learned by PIT tag work that we don't know now.

Gene Matthews described the modifications to the Lower Granite Dam juvenile facilities and said that a mock-up would be built and tested at Pasco, Washington, and Committee members would have an opportunity to see if it works satisfactorily before it would be installed at the dam. John Ferguson asked if the cost of building and putting in the modifications to the juvenile facilities to separate PIT-tagged fish was known yet, and Matthews said no.

Earl Prentice explained that his data to date indicated there is no reason to question long term success with the PIT tag, although no fish have been held until maturity.

Bill Nelson expressed the following concerns about this task:

- 1) The survival rate of PIT-tagged hatchery and wild fish from tagging to recovery at Lower Granite Dam is unknown.
- 2) No control fish would be marked.
- 3) The major advantage of the PIT tag pertains to recovery of smolts and not adults whereas the failure to demonstrate a transport benefit has been caused by inadequate adult return. Therefore, how would PIT tagging only one-third as many smolts result in sufficient adult returns to provide meaningful results?

Combining these comments with the stated unknowns concerning development and installation of the detection and separation system, detection of PIT tagged adults, and reliability of the tags in adults leads me to the conclusion that initiation of this task at this time is premature.

Donn Park stated that the use of the PIT tag would allow separating various aspects of the value of transportation (e.g., the relative benefits of transporting hatchery and wild fish). This would have direct implications in management in that it

might show an overall benefit for transportation even though the benefit for transporting hatchery fish may be small to none.

The Committee members finally agreed that this task proceed through the initial 1988 stage to include marking additional wild fish in 1988. The overall task would be reviewed pending the results of the Pasco demonstration of the detection and separation system. Further information on the reliability, etc., of the PIT tag would also be reviewed at that time.

Task 1.3 (Recover adults previously marked with CWTs and PIT tags and analyse adult return data) and 2.2 (Method of adult recovery and statistical treatment of adult return data will be the same as outlined in Task 1.3) were approved with minimum discussions.

Objective 3 (Measure the incidence and severity of BKD in spring chinook salmon smolts collected for transport at Lower Granite Dam) was also unanimously approved.

Before the committee finished discussion of this proposal, Doug Arndt stated that the COE may introduce a proposal to specifically determine what is causing the low return rate for spring chinook salmon.

2. Contribution of the ice and trash sluiceway at the Bonneville Dam Second Powerhouse to passage and survival of juvenile salmonids--Dave Ward.

The study, as presented, consisted of two areas of emphasis: (1) sluiceway sampling and (2) survival with passage

through the sluiceway. There was considerable discussion on the relative merits of the 100% sampler vs the 10% sampler. Chuck Willis asked what 100% meant, and Ward replied 100% of the water, 100% of the time for 8 hours per test day. The probability of the study, as proposed, getting statistically sound data was discussed in detail. The Committee unanimously recommended that the researchers explore their trapping techniques to develop the best possible scenario and then meet with Lyle Calvin and carefully work out a statistically sound study. Those details were to be worked out in time to issue appropriate bids, etc., for 1989--thus because of timing problems with funds and time needed to work out details for the study, the sluiceway sampling portion of the study was postponed.

Discussion relating to the portion of the study concerned with survival through the sluiceway was centered about the adequacy of the controls as presented in the proposal. The final recommendation of the Committee was to go ahead with this portion of the study with the following provisos:

1. The study would have to be carried out under realistic conditions (i.e., turbines operating).
2. Two control groups would be released--one in the tailrace just below the sluiceway outfall and a second group in the tailrace downstream from the point where predators attracted to the sluiceway outfall would be a problem.

Ward was instructed to conduct tests to make sure his crew could purse seine in the appropriate locations in the tailrace with the turbines running and ODF&W was also asked to make certain that fish were available for the test releases as proposed as well as the two groups of control fish. He was to report back to the Committee (via the chairman) as soon as possible--if purse seining wasn't possible or if there weren't sufficient fish available, the Committee recommended not doing this portion of the study.

3. Forebay migration routes and passage locations of salmonid smolt s at Bonneville Dam--Lowell Stuehrenberg.

The study was divided into two major objectives:

- (1) identifying routes of salmonids as they approach the dam and
- (2) evaluating the feasibility of using radio tags to estimate the proportions of fish passing Bonneville Dam via the First Powerhouse, the Second Powerhouse, and the spillway.

Bob Vreeland asked where fish would be released, and Stuehrenberg replied in three locations near Stephenson, WA--one near the Washington shore, one near the Oregon shore, and one near the middle of the river. Additional fish would be released near the Washington shore in the channel leading to the Second Powerhouse.

It was recommended by the Committee that some fish be released into the tailrace near the sluiceway outfall when the

turbines were not operating to get an idea of the fish's behavior under these conditions.

Rod Woodin and others wondered how representative the behavior of the tagged fish was to the overall population. Stuehrenberg gave data from a previous study at John Day Dam that showed that information obtained from sampling in the forebay with purse seines corresponded fairly well with radio-tracking data. The researchers emphasized that the data obtained would be qualitative.

The Committee unanimously agreed that Objective I (Identify migration routes of yearling chinook salmon and steelhead smolts as they approach the dam from release sites upstream from Cascade Locks and identify the passage location of the migrants at the dam) of this proposal should be done including laboratory work with steelhead.

After considerable discussion about Objective II (Evaluate the feasibility of using the radio tag to estimate the proportion of the yearling chinook salmon and steelhead populations passing Bonneville Dam via three routes: Bonneville First Powerhouse, Bonneville Second Powerhouse, and the spillway) of the proposal, the Committee voted five to four to reject Objective II--most of those voting to go ahead with Objective II recommended that the work be given low priority for this year. After rejection of the Objective II, it was recommended that the tags reserved for Objective II be applied to Objective I studies. It was also recommended that in addition to tracking chinook salmon, coho salmon should also be tracked.

4. Hvdroacoustic evaluation of the efficiency of the Bonneville Dam Second Powerhouse ice and trash sluicewav for passing downstream migrating juvenile salmonids in 1988--R. Magne.

Both Pettit and Willis pointed out initially that the CBFWA had communicated with the COE (Se^ptember 1987), expressing their willingness to investigate daytime powerhouse operations only if specific improvements to Bonneville II's bypass system were made prior to the 1988 field season.

Much of the discussion related to the technical capabilities of hydroacoustics to supply meaningful data. Phil Mundy expressed concern about measurement-error and the problem of subyearlings being ignored by the electronics system. He felt that the error introduced by assuming a uniform distribution of targets to expand the count of targets within each distance stratum of the transducer beam should have been addressed in the proposal. Mundy further noted that it could be determined if project counts represent a fair sample of the popluation by comparing the frequency distribution of target strengths, as measured from the dual beam sonar, to the size frequency distribution of the fish, as measured in the fyke net samples being collected concurrently in the FGE study. If the interrogation aspect of the targets is consistent enough to support sonar enumeration, then the shape of the two frequency distributions should be the same, expect for differences due to measurement error. Lack of correspondence between the two

distributions would need to be explained. Both distributions might be truncated on the left hand side, if an unfavorable interrogation aspect is obtained for subyearling chinook salmon at a time when subyearling chinook salmon form a substantial component in the stocks passing the study site. Mundy felt that plans to assess the relative importance of each of these items should have been included in the research proposal. Magne said they were aware of the shortcomings and were improving the technique all the time. They were counting on some of the ancillary studies mentioned in the proposal to help in calibrating the system and reducing systematic errors. Magne further stated they would contract with a leading expert in this area to assist them. Some Agency and Tribal committee members commented that they were least comfortable with the hydroacoustic assessment of fish passage through the sluiceway without a direct fish capture verification. Willis said that since the verification study (Number 2) was deferred until 1989, it was his suggestion that it also made sense to defer daytime powerhouse operation evaluation until 1989. Considerable discussion also took place on what a test design should include in the way at turbine operation during tests. The Committee concluded that two conditions should be tested: (1) a base condition [defined as two units (11 & 18) running] and a condition with five units running.

With regards to Objective 5 (Determine ways to effectively make hydroacoustic estimates at the first powerhouse main turbine

intakes, sluiceway intakes, and spillway), the Committee unanimously voted that the COE (within funds available) go ahead with the scoping, development of specifications, and issuing of a contract to determine the feasibility of making hydroacoustic estimates of passage at the Bonneville First Powerhouse and spillway.

The Committee approved the study with the aforementioned recommendations.

5. Continuing studies to improve and evaluate the juvenile bypass systems at Bonneville Dam--Michael Gessel.

Discussion by the Committee seemed to center on the number of replicates needed, what conditions would be tested, and how the researchers would decide to move on to the next conditions to be tested. In relation to Objective I (Continue FGE tests at the Second Powerhouse to determine guidability of yearling chinook salmon and steelhead in May-early June and subyearling chinook salmon in early June-early August), the Committee decided that Gessel should provide a basic flow diagram and decision tree that would enable the Committee to understand how the tests would progress. John Williams agreed to work with Gessel, Calvin, and the Bonneville Second Powerhouse Task Force and provide what the Committee desired.

Objective 2 (Conduct vertical distribution tests at the Second Powerhouse) was approved with little discussion after

Gessel explained why vertical distribution data were needed in relation to each test of FGE.

Objective 4 (Conduct FGE tests at the First Powerhouse to determine FGE of yearling chinook salmon and steelhead during May and subyearling chinook salmon in June-July) was considered next, and the Committee decided that the work should go ahead but with subyearlings only. The Committee was not unanimous in this recommendation with five members voting to do the work but with subyearlings only, three members voting not to do the work at all, and one member not voting.

Objectives 3 (Determine if the smoltification status of salmonids passing the Second Powerhouse changes and assess its relation to FGE) and 5 (Determine if the smoltification status of salmonids passing the First Powerhouse changes and assess its relation to FGE) were discussed together. Phil Mundy opined that measuring the variance of $\text{Na}^+\text{-K}^+$ ATPase may be more important than the point estimates themselves for understanding FGE. Chuck Willis asked if there would be an effort to gather data on specific hatchery groups, and Al Giorgi replied it could be possible if pool releases occurred while FGE tests were being conducted. Doug Arndt saw value in the study but felt it should be deferred to 1989 and be done at Lower Granite Dam.

The Committee voted eight to one to okay the study, with the caveat that fish should not be sacrificed from the gatewells if there were insufficient fish captured in the nets to provide a statistically acceptable estimate of FGE.

6. Biological manipulation of migration rate and FGE:___ the use of advanced photoperiod to accelerate smoltification in yearling chinook salmon--Al Giorgi.

Bob Vreeland asked if perhaps the researchers were jumping the gun in supposing that all non-guided fish were hatchery fish. Giorgi replied this was not the case, but hatchery fish were a group that something could be done about.

Steve Pettit felt the research may be academic because many hatcheries could not take advantage of the techniques developed. Giorgi felt there were sufficient numbers of hatcheries that could adopt the program if the research showed positive results.

Pettit asked if these test fish would be marked again if they were recovered at collection dams, and Park and Giorgi replied no.

Chuck Willis felt this was good research that tested a specific hypothesis and it should. go ahead.

Phil Mundy felt the timing data that will be generated will be useful, the study is a good start on this type of research, and the study will provide useful insight.

The Committee unanimously voted that the research should go ahead. Several members, however, felt it was the type of research best supported by BPA.

7. Evaluation of juvenile salmonid survival through the spillways and turbines at Lower Granite Dam--Gene Matthews.

There was considerable discussion of why Lower Granite Dam was chosen as the site for the research, but in the end, the group concluded that Lower Granite Dam was okay. Al Giorgi felt that similar studies at several sites would provide good up-to-date information for various models, particularly FISHPASS.

Phil Mundy supported the research but questioned the accuracy of the models because he questions if the best concept of turbine mortality is being used. Turbine mortality should give consideration to "swimming wounded" or fish that may survive to the next dam but will subsequently die from problems incurred during previous turbine passage. Mundy felt that a further problem with the estimation procedure is that mortality of the test groups can't be partitioned into mortality which occurred in the treatment (passage through either turbine or spillway), and mortality which occurred subsequent to the treatment during transit to the next dam. He believes that the only way to partition the treatment mortalities into dam and reservoir components is to count or estimate the number of treatment fish which leave the dam and enter the reservoir alive. In Mundy's opinion, the proposed estimators now represent turbine (or spill) mortality only if one is willing to accept the mortality which occurs in the substantial amount of time which elapses between the time of the treatment and the time when the number of

survivors is estimated as being the direct result of the treatment. He also felt there were many variables in turbine operation which have been shown to be significant covariates of mortality in prior studies that weren't being given adequate attention (e.g., blade angle, Sigma, gate settings, etc.).

There was some discussion of spill at Lower Granite Dam. Bill Nelson felt that since spill at Lower Granite Dam is not normal, the distribution of predators will not be the same. Matthews felt that even if this were true, there will be spill sometimes. Phil Mundy pointed out that the results of the experiment would be more useful if the experiment was conducted in two separate trials, one with spill, and one without spill. He notes that the question of the effect of project operations on subsequent survivals is becoming increasingly important in the inseason management arena.

The Committee unanimously voted to support the work, but two members felt it had a low priority and those members would have preferred the work to be done at Ice Harbor Dam. The Committee also recommended that the control release be a hose release in the front roll.

8. Evaluation of juvenile salmonid survival through downstream migrant bypass systems, spillways, and turbines (Bonneville Dam)--David Damkaer and Earl Dawlev.

The researchers furnished a proposed mark and release schedule for 1988 (Attachment 3). Most of the discussion related

to release of the control fish. It was finally decided that the Number 1 Option would be to release the fish from an LCM in mid-river. If this proves to be impossible, the fish should be released via a hose below the powerhouse and spillway. The Committee felt the researchers should plan for spill, but if there isn't any, the fish that would have been used for spillway releases should be put to use elsewhere.

Phil Mundy voiced the same concerns as he did in evaluating Matthews' Lower Granite study about the potential influence of turbine and other operational characteristics on the outcome of the experiments, and John Williams said these data will be considered and there will be an appropriate discussion in the report.

Steve Pettit asked that turbines and spillways be operated at least 2 hours before and 6 hours after fish releases--all agreed.

The Committee unanimously approved the research.

Teri Barila distributed a draft report from BioSonics and asked that Committee members review it and provide comments within 30 days.

The meeting was adjourned at 1500 hours 5 November 1987.

Attachments

COLUMBIA BASIN FISH AND WILDLIFE AUTHORITY

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OFFICE OF
EXECUTIVE SECRETARY

December 21, 1987

Colonel James R. Fry
Corps of Engineers
North Pacific Division
P. O. Box 2870
Portland, Or. 97208-2870

Dear Jim:

This is to inform you of certain reservations on our participation in the Research Needs Subcommittee which result from our dissatisfaction with the Fish Passage Development and Evaluation Process. We want to make it clear that a large part of our dissatisfaction with the FPDEP process is that we are able only to prioritize projects and not areas of emphasis and major questions. Projects are only bits and pieces of a coherent research strategy which is sadly lacking for mainstem Columbia and Snake River research. As justification we note that our past frustration with the FPDEP process had lead to the conclusion that any attempt to prioritize research as either major areas of emphasis or individual projects would be pointless without some executive level assurances that the priorities would eventually be honored. Further, the failure of the Reservoir Mortality/Water Budget Effectiveness Technical Work Group process, and the exclusion of the Bypass and Transport TWG's from the Council process have left unsatisfied the strong need for coordination of mainstem research. In order to promote the more coherent research strategy we gave to you in the Mainstem Executive Committee (MEC), we are limiting our staff to the following:

- 1) Our participation in the RNS is limited to identification of research objectives and the areas of study within which lists of research projects may be prioritized later on.
- 2) CBFWA will not participate in the prioritization process beyond the identification of objectives unless a) BPA and PNUCC agree to participate and address BPA-funded and Corps funded research concurrently b) the prioritization occurs within a set of policy guidelines of the MEC and c) consistent with the four stage proposal of the MEC agrees to consider, modify if necessary, and endorse the list of priority research areas, and later on, lists of projects, produced by the RNS.

Sincerely,



John R. Donaldson, PhD
Executive Secretary

JRD/je

APPENDIX III

THE FISH TRANSPORTATION OVERSIGHT TEAM'S ANNUAL WORK PLAN FOR TRANSPORT OPERATIONS

AT' LOWER GRANITE, LITTLE' GOOSE, AND McNARY DAM'S FOR FIELD YEAR (FY) 1988

A. Introduction

This work plan is provided to describe operations and establish criteria for the transportation of juvenile migrants at the following collector dams: Lower Granite, Little Goose, and McNary. There are cooperative agreements between State fishery agencies and Walla Walla District, Corps of Engineers (NPW) to provide biologists who represent the States through direct onsite participation. The Fish Transportation Oversight Team (FTOT) will provide oversight of the transport program. Fishery agencies and tribes will provide biological oversight through the Columbia Basin Fish and Wildlife Authority (CBFWA) while NPW will be responsible for facilities management. The FTOT will provide necessary coordination of transport activities among the CBFWA members, NPW, and Fish Passage Center (FPC).

B. Objectives:

The purpose of this plan is to establish guidelines to maximize survival of fish collected and transported by:

1. providing efficient collection and safe barge or truck transport of juvenile salmonids from collector dams to their release points below Bonneville Dam.
2. inspecting facilities prior to, during, and after the juvenile migration season. These inspections will be conducted by FTOT, NPW, state, and tribal biologists to ensure facility readiness and operation according to established criteria as well as determining maintenance requirements for the following season.
3. identifying and recommending any changes that would benefit fish collection and transport operations and/or bypass systems related to transportation.
4. assuring that collection, transport, and release site facilities will be ready for operation prior to the spring juvenile outmigration (April 1, 1988).
5. following operating criteria established for facilities, barges, and trucks. Criteria will be updated to maintain standards for holding

fish, i.e., fish densities, sampling, and facility operation and maintenance. The FTOT will monitor and coordinate changes during the transport season.

6. coordinating evaluation of the transportation program for 1988.
7. training new personnel associated with collection and transport facilities.
8. preparing an annual report detailing the past year's transportation effort.

C. Project Operations for Juvenile Fish Protection

The NPW has responsibility for maintaining all equipment and providing safe passage for juvenile fish. Procedures to meet these requirements are listed below:

1. Turbine Operations/Generation

During the juvenile fish outmigration, normal turbine unit loading should be as near to peak efficiency (135 mw at Snake River Projects and 70 mw at McNary) as possible. This will reduce mortality to fish passing through turbines.

2. Unit Priority and Operation

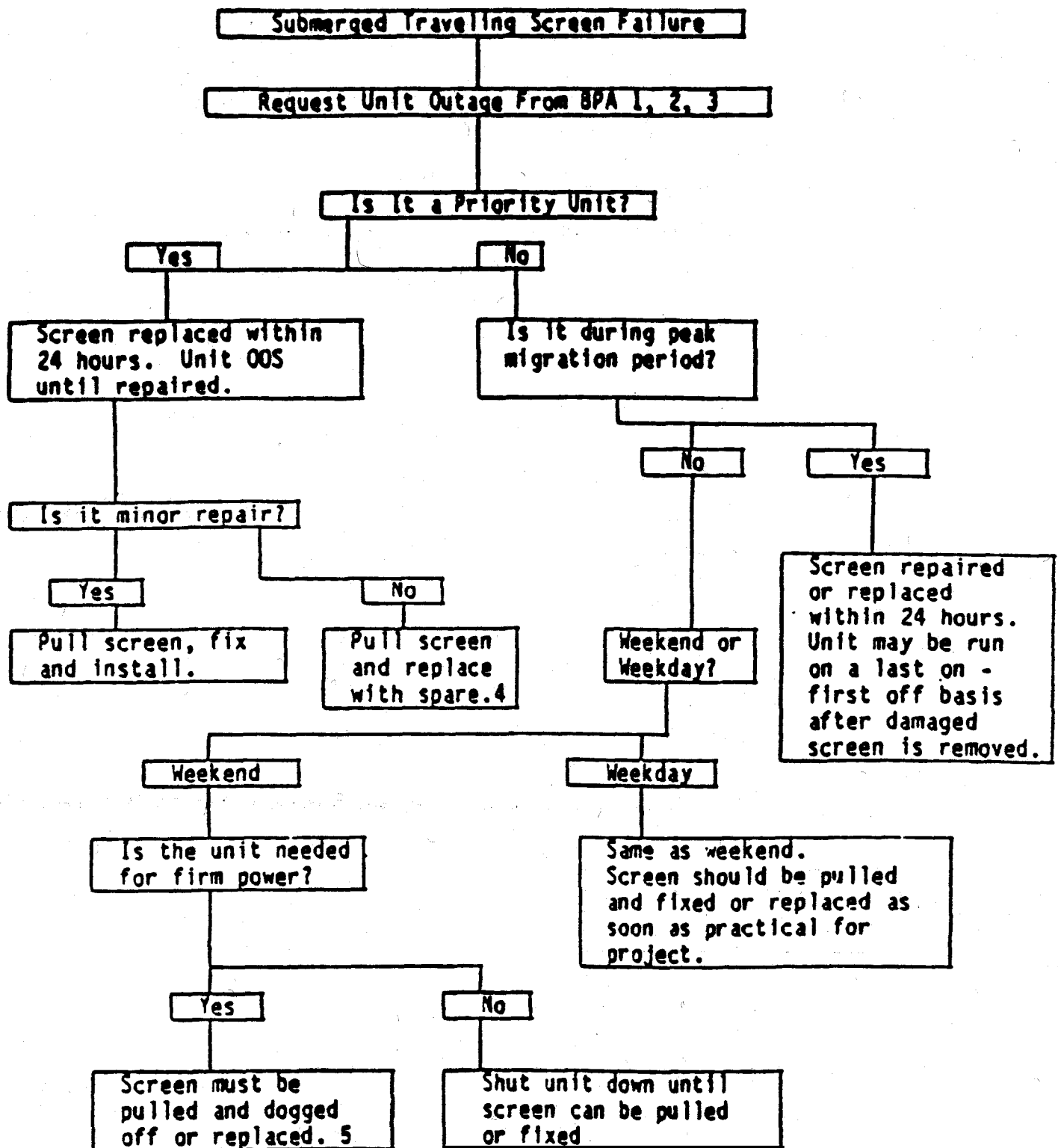
Research has shown that certain units collect more fish than others. Units with higher collections are referred to as "priority units". These priority units are 1 through 4 at Lower Granite and Little Goose Dams and 1, 2, 14 and 4-10 at McNary. McNary unit 14 has priority because it provides current for juveniles at the downstream end of the ice and trash sluiceway. The priority of unit operation at Lower Granite and Little Goose will proceed from unit 1 through 6 and at McNary Dam from unit 1, 2, 14, 4-10, 3, 11, 12, 13 consecutively.

Frequently during July, water temperature at McNary increases to a *level* that causes higher than normal fish mortality. At such time when mortality exceeds 4 percent of fish collected, or there is evidence of a daily peak in juvenile fish mortality due to thermal stress, the following special powerhouse operation should be implemented:

a. Special powerhouse operation

- 1) Unit 1 (for adult attraction), then
- 2) Units 14, 13, 12, 11, 10, 9, and 8.

b. Unit loading



- NOTES:
1. A unit must not be run with a known damaged or malfunctioning screen.
 2. Project biologists should be notified as soon as practical of any screen damage or malfunctions. The project biologists will in turn notify FTOT including details of problem and anticipated repair time.
 3. If a screen malfunctions and additional generation is needed, the remaining units can be operated above peak loading efficiency. Load should be spread evenly among all available units or all placed on low priority units.
 4. If no spare screen is available then C slot screen from lowest priority unit should be used.
 5. Any units that must be operated without a full complement of screens should be done so on a last on - first off basis in order of priority.

Units should be operated near best efficiency but may be operated between 50 and 80 mw to minimize starting and stopping them. If additional generation is needed beyond 80 megawatts per each above unit then additional units may be brought on line beginning with unit 7 and continuing thru unit 5. Unit 4, 3 or 2 should not be operated when thermal stress related mortality is occurring at the project.

3. Submersible Traveling Screens (STS)

a. Operation

STSS in units 1 and 2 will be installed and in operation at Lower Granite and Little Goose by March 15, 1988. The remainder will be installed immediately after the annual lock outage. At McNary, STSS in units 4 through 10 will be installed by March 15, 1988, the remainder no later than April 1, 1988. STSS will be cycled except when chinook fork length is less than 112 mm or when a sudden decline in fish condition warrants continuous screen operation. Cycling may resume once chinook fork length exceeds 112 mm and/or fish condition warrants it. FTOT will be responsible for determining when to implement continuous or cyclic operation of screens based on data provided by on-site biologists. Immediately after resumption of screen cycling, fish condition will be monitored to verify that the operational change does not affect fish quality.

b. Maintenance

The number and condition of fish collected depend upon well-maintained screens. Continuous monitoring of screen operation is provided by annunciation (automatic warning system) to the powerhouse control room. FTOT and fishery biologists at each dam will be informed of any STS malfunctions. During peak migration periods or when a priority screen malfunctions, the malfunctioning screen must be replaced within 24 hours (Figure 1). When a malfunctioning screen is noted, there are two options within flow limits that NPW can take:

- 1) cease generation in the affected unit until the screen is pulled and repaired, or:
- 2) pull the STS and either repair or replace with the spare or a designated replacement screen.

NOTE: A known damaged screen must not be used in a generating unit.

At each collector dam, spare screens are provided, 1 each at Lower Granite and Little Goose and 2 at McNary. If additional screens are needed to replace damaged screens in high priority units, they should be from non-operating units (long term out of service) or taken from C-slots of the lowest priority units on line. A low priority unit

from which a screen has been removed to replace a damaged screen can be operated without a full complement of screens.

During weekends, if project maintenance crews are not available and a screen malfunctions, the affected unit must be shut down and generation switched to a non-operating screened unit. If all screened units are operating, then generation may exceed peak efficiency ranges in non-affected units if necessary, or water can be spilled as necessary until the STS can be pulled and repaired or replaced with a spare or designated screen. If the affected unit is required for adult passage attraction (unit 1 at Snake River projects, units 1 and 2 at McNary), a decision to shut the unit off over a weekend must not be made without coordinating adult passage concerns through NPW Biologist, FPC Coordinator and FTOT.

c. Inspection

FTOT will be given an opportunity to perform a visual inspection of STSs at all projects prior to the transport season.

The STS monitoring schedule at Snake River projects should begin with an initial TV video inspection during April, prior to the outmigration peak that normally occurs during the final week of April or early May. Subsequent inspections should be conducted each month that screen operations continue.

At McNary, screen inspections will occur on a continuous basis according to the following schedule:

- 1) April, week 1, units 4 and 5,
- 2) April, week 2, units 6 and 7,
- 3) April, week 3, units 8 and 9,
- 4) April, week 4, units 10 and 1,
- 5) May through July, 3 units per week in the following sequence:
2, 14, 3, 11, 12, 13, 4, 5, 6, 7, 8, 9, 10, 1, 2-14,....
- 6) August, September, first .2 weeks in October, 2 units per week continuing the sequence in 5) above.

If abnormal STS problems occur, FTOT will be notified and the project will immediately return to inspecting 3 units per week. FTOT may further recommend changes to the unit inspection schedule if thermal stress problems occur during July or August.

Unscheduled inspections may be required at any of the collector projects under the following conditions:

- 1) deterioration of fish condition;
- 2) increased debris load in bypass system; and
- 3) other indications of STS malfunction.

4. Peak Migration Periods

The peak migration period begins when total collection at an individual project reaches 20,000 fish per day. Migration peaks at Snake River projects generally occur between April 15 and May 31. McNary peaks vary, but major migrations of spring and summer fish occur between May and mid-August.

5. Debris Problems and Trash Raking

Debris will be removed from trashracks and forebay surface in front of turbine units prior to STS installation and thereafter as it accumulates. Gatewells will be monitored daily for trash buildup and checked at least twice a week for water drawdown (head differential) between the forebay and gatewells. Drawdown may be measured once per week at Little Goose and McNary during periods of low debris accumulation and good fish condition. Head differential measurements at Lower Granite, Little Goose, and McNary Dams will be recorded upon initial trash rack raking. Thereafter, when head differential is greater than 1 foot over the initial measurement without debris, or when on-site biologists determine that higher than normal descaling rates indicate that trashracks are likely to be the cause of injury, trashracks will be raked again. Additional raking of trashracks may be necessary as determined by on-site biologists such as when a storm causes massive quantities of debris to be brought down the river system.

When raking is conducted at Snake River collector projects, unit outages are required. When the center trashrack (B) is being raked adjacent units do not have to be shut off. When trashracks A or C are being raked, the adjacent unit must be shut down. Gatewell orifices must be closed in the unit being raked. Project biologists will inform FTOT when trashracks are raked.

McNary orifices are larger and do not appear to plug as they do at Lower Granite.

Because McNary personnel have raised a concern about potential gatewell orifice plugging during forebay debris dipping, the orifices should be closed during dipping operations. Also, particular attention should be directed to monitoring adjacent unit orifices to detect plugging problems as early as possible.

6. Facility Operations

The collection facility will be manned 24 hours per day until system operations cease. Fish will be returned to the river if they are not being transported.

Gatewell orifices will be checked daily and cleaned when necessary.

Water level in the gallery will be checked daily and flows at the juvenile fish separator will be monitored continuously (at least every 15 minutes).

When screens and bypass systems are not providing safe passage and meeting criteria, FTOT will alert the Fish Passage Managers of problems that may require system operational changes.

a. McNary

If flow exceeds minimum (220 kcfs), fish will be separated by size as long as yearling salmon predominate in the collection. Normally, if flows are projected to drop below 220 Kcfs for approximately 5 days transportation will be maximized to prevent bypassing fish into a deteriorating flow pattern. If existing or projected conditions warrant a change in this criterion, FTOT will coordinate recommended deviations with the fisheries agencies and tribes prior to implementation. Smaller fish (salmon) will be returned to the river and larger fish (steelhead) will be transported. When subyearling summer/fall chinook numbers exceed numbers of yearling salmon, all collected fish will be transported. Subsamples will be examined for marks or used for research purposes and then released to tailwater or transported. Maximum collection and transportation of all species will be implemented when flows are at or below minimum.

Fall chinook fry (alevins) will be bypassed to the ice/trash sluiceway by pulling the flume screen if impingement problems arise.

b. Lower Granite All fish collected will

be transported.

c. Little Goose

If flow exceeds minimum (100 Kcfs), fish will be separated by size and smaller fish returned to the river. Normally, if flows are projected to drop below 100 Kcfs for approximately 5 days transportation will be maximized to prevent bypassing fish into a deteriorating flow pattern. Because of the extended period expected for fish to move through the lower Snake River under low-flow conditions, it is desirable to anticipate sub-minimum flows there as far in advance as is practicable (approximately 3-5 days) and initiate transportation of all species at that time. If existing or projected conditions warrant a change in the criteria, FTOT will coordinate recommended deviations with the fisheries agencies and tribes prior to implementation. Larger fish will be transported until approximately 80 percent of the yearling chinook migrants (as determined by the Fish Passage Managers) have passed and steelhead numbers predominate. Then, all fish collected will be transported.

7. Sampling Procedures

- a. Sampling will be done in accordance with sampling guidelines for 1988 as developed by CBFWA (Appendices 1 and 2).

Fish that are in the sample group will be counted by electronic counting tunnels. All estimated fish counts and raceway loading densities will be based on a sample of the total fish collected. Samples will be taken throughout a 24-hour day i.e. about 3-5 minutes per hour.

Species composition and weight samples are necessary to determine loading densities in individual raceways. This sampling will require that project personnel keep a running hourly total of expanded fish numbers and raceway totals.

8. Facility and Equipment Logs and Records

To monitor collection and transport activities the following items will be logged at each dam by either NPW-personnel or state fishery biologists.

- a. STS Activity - A log of STS operation and inspection should be maintained by the projects. Changes in operational modes or malfunctions and repairs will be noted, including dates of occurrence.
- b. Gatewells - Recordings of head differential between the gatewells and forebays will be logged. Trash raking will occur when differentials reach established limits, or as noted in Section 5, Debris Problems and Trash Raking. All debris assessments will be recorded.
- c. Fingerling Facilities - Daily logs will be maintained of fish counts/hr/day by species, truck and barge operations, fish sampling, mark recovery, and general observations of fish condition and fingerling passage. Mortalities will be listed by species in all areas of the, collection and transport system.
- d. Trucks and Bar^{es}es - Fish transport equipment activities will be logged daily including transport time, problems encountered, estimated fish mortalities, and any equipment malfunctions.
- e. At Little Goose, dissolved gas levels in the forebay, upwell, hopper, gallery, and raceways will be measured and recorded at appropriate time intervals. Hopper water surface elevation will be noted coincident with gas measurements.

9. Loading Criteria

Maximum raceway holding capacity is 0.5, lbs. of fish per gallon of

water. Inflow to raceways is approximately 1200 gpm at Snake River projects and 1000 gpm at McNary. Individual raceway volume is approximately 12,000 gallons of water at Snake River dams. Individual raceway capacity at McNary Dam is 5,000 gallons plus 2 temporary raceways with 7,400 gallons each. Exceeding holding criteria is not anticipated except during peak outmigration periods. During peak periods, any decision to exceed loading densities at Snake River projects will be coordinated by FTOT. A decision will then be made by the tribes and fisheries agencies to either exceed recommended densities, or bypass fish back to the river. Conditions that must be considered include:

- 1) species composition;
- 2) total anticipated collection during the critical holding period;
- 3) inriver bypass conditions; and
- 4) fish condition.

At McNary Dam, loading criteria will be adhered to regardless of collection capabilities. When fish poundage in raceways reaches established limits (holding capacity), fish will be bypassed to the river. During periods when large numbers of fall chinook are collected, poundage limits may be inadequate. Total numbers of fall chinook should not exceed 50,000 per concrete raceway or 75,000 per temporary raceway. Total facility holding capacity is 500,000 fall chinook.

At Lower Granite and Little Goose Dams, the raceway capacity may be temporarily exceeded above the established criteria of 0.5 lb/gal. Exceeding recommended loading criteria is dependent on the percentage of steelhead to chinook ratio in the sample. Fish may be held at the higher criteria (up to 1.0 lb/gal) only when steelhead composition in the raceway exceeds 80 percent of the total fish collected. This will minimize the impact of overcrowding spring/summer chinook.

Collected fish should be spread among raceways to prevent crowding and reduce the risk of disease and disaster even when densities are less than holding criteria. Maximum holding time in raceways will not exceed two days except as noted in Section 10a.

The following are criteria established for the fish barges and trucks:

<u>Barge</u>	<u>Capacity</u>	<u>Inflow(gpm)</u>	<u>Fish Holding Capacity (lbs)</u>
2817	85,000	5,200	26,000
2127	85,000	5,200	26,000
4382	100,000	10,000	50,000
4394	100,000	10,000	50,000
Truck	3,500		1,750

Holding criteria for the barges have been set at 5 lb. of fish/glom inflow. Truck loading criterion is 0.5 lb. of fish/gallon of water.

10. Transport Operations

a. Truck and Barge Operations (Spring and Summer Migration)

Four fish barges are available that will allow a barge load of fish to leave Lower Granite daily. It takes approximately 90 hours to make a trip to the release site below Bonneville Dam and return. The barges are unloaded below Beacon Rock near the Skamania light buoy.

Early migrants will be trucked until barging is implemented approximately April 10. Fish holding criteria during early April at Snake River projects can be increased to 4 days or until daily counts exceed 20,000 fish. Barging should continue through the peak spring migration period or until smolt numbers decline to below 20,000 per day. Direct loading of fish into barges should be done at Lower Granite whenever possible.

Two fish barges will be available to transport fall chinook during the peak summer migration, occurring about June 20 to August 10 at McNary Dam.

Corps personnel will be on barges to supervise all loading and off-loading operations. During the training period, barge personnel will receive instructions on dealing with emergencies. If an emergency situation occurs while the barge is underway, the barge rider is responsible for deciding if and where an early release will be made. There will be radio contact between barges and dams on the transportation route. Project biologists will be notified of any major problems that occur. They will in turn notify FTOT.

Five tank trailers are available for hauling fish. The spring release of trucked fish in 1988 will be at Bradford Island, adjacent to Bonneville First Powerhouse. The summer release of trucked fish will be at Hamilton Island. Alternate release

sites are located at Dalton Point and Bonneville Second Powerhouse.

Truck drivers will be familiar with fish life support systems on their tank trailer and the sensitivity of juvenile salmonids to stress. Drivers will be trained to know where and under what conditions fish must be released in an emergency.

b. Summer Transport Program

At McNary Dam, collection and transportation of all species will begin when subyearling chinook exceed yearling salmon counts. Transportation will continue until numbers of fish collected are 1,000 or less for 5 consecutive days (approximately September 30). Other factors that may cause early termination of transport include high fish mortality or injury rates.

Collection and transportation of summer migrants will be maximized at Lower Granite and Little Goose dams. Transport will continue until approximately August 1 or until fish numbers approach 500 per day. Factors that could cause earlier termination of truck transport include high fish mortality or injury rates.

11. State Roles

Fishery agencies and tribes are responsible for biological oversight of fish at transport dams. NPW funds State fish biologists or culturists at each collector facility by cooperative agreement. Idaho personnel will be stationed at Lower Granite, Oregon's at Little Goose, and Washington's at McNary.

Cooperative agreements between States and NPW specify duties of state personnel in task orders as follows:

- 1) fish sampling and handling,
- 2) evaluations of fish condition,
- 3) double checks on expanded calculations of total facility collection,
- 4) quality control inspections of collection and transport facilities,
- 5) monitoring fish research activities at dams, and
- 6) participating in gatewell dipping as necessary to monitor quality of fish.

12. Dissemination of Information

Fishery biologists at each dam will be responsible for entering all pertinent information into the computer data base. This will include chinook, steelhead, sockeye, and coho daily collection and transport totals. This information will then be available in Walla Walla and Portland Districts, and North Pacific Division (NPD) office.

Information will be provided to user groups through the Smolt Monitoring Program. Fish Passage Center will provide a weekly summary report of transport numbers from collector dams to fishery agencies, tribes, Corps offices, BPA, NPPC, PUDs, etc.

13. NPW Project Requirements for Fishery Agency Activities

To maintain a good working relationship and communication process at NPW projects, fishery agencies and tribes will follow certain courtesies and safety habits. They include:

- 1) checking into the project properly i.e. notifying project engineers, biologists, or powerhouse operator that you will be arriving or have arrived on site,
- 2) adherence to local project requirements (hard hats, safety procedures, etc.), and
- 3) prior arrangements or notification of any unscheduled activities (research, etc).

Appendix 1 - Sampling Guidelines for Collector Dams in 1988

Appendix 2 - Guidelines for Increased Fish Samples at McNary and Lower Granite Dams in 1988

APPENDIX 2

GUIDELINES FOR INCREASED FISH SAMPLES AT MCNARY AND LOWER GRANITE DAMS IN 1988

A. INTRODUCTION

In order to evaluate the success of transporting spring chinook smolts to below Bonneville Dam, the fishery agencies and tribes have authorized the Corps to conduct a marking program. However, workers are having difficulty collecting and marking the number of spring chinook required in approved study plans. This is because increasing numbers of marked fish are being released from upriver sites.

The following percentage of yearling chinook collected at McNary between April 21, and June 6, 1986 and 1987 were not suitable for marking because they were:

	1986	1987
1. Adipose clipped	15.8%	12.0%
2. Branded	5.6%	3.4%
3. Descaled	8.1%	6.0%
4. Severely injured	1.5%	2.8%
5. Dead	1.5%	1.9%
6. Fall chinook	7.6%	13.6%

It is questionable whether the required numbers of markable fish for the transport evaluation program and PIT tag study can be obtained using the established sampling guidelines (APPENDIX 1). The fishery agencies and tribes have agreed to waive portions of these guidelines for the purpose of these studies in 1988.

Allowable exceptions to the established guidelines are as follows:

B. LOWER GRANITE

1. Sampling Objectives

- a. To safely handle the required numbers of fish to operate the transport program and monitor the smolt migration.

¹Marking and release of control fish below Little Goose Dam is contingent upon Snake River flows above 100 KCFS Daily Average Flow (DAF). If flows are projected to be below 100 KCFS DAF, marking control fish will not be done because the chance of survival in large enough numbers to be meaningful is low.

- b. To provide previously-approved numbers of markable fish to conduct the transport evaluation and PIT tag study.

2. Daily Sampling Rate

If sampling under established guidelines (APPENDIX 1) is insufficient to meet objective 2, then the sampling rate may be increased to a level that will provide previously-approved numbers of markable fish as per the study plan. However, this rate may not be increased if it would result in more than 15,000 fish being in the sample tank. At no time shall the total sample held in the tank exceed 2600 pounds at Lower Granite. The above criteria are to be implemented during a 24 hours sample period in which double shifting is occurring for marking transport evaluation fish.

C. LITTLE GOOSE

Follow established guidelines (APPENDIX 1)

MCNARY

1. Sampling Objective

Same as Lower Granite

Except that during years that high numbers of fish are required for experimental purposes, the sample time will be from noon to noon. This reduces the sample tank holding time by allowing workers to move fish from the sample tank before the next days sample begins.

2. Daily Sampling Rate

If the sample collected under established guidelines (APPENDIX 1) is insufficient to meet objective 2, then the sampling rate may be increased to a level that will provide previously-approved numbers of markable fish as per the study plan. However the rate may not be increased if it would result in more than 15,000 fish being collected in the sample during the 24 hour sampling period. At no time shall the total sample exceed 1800 lbs at McNary. Changes in the sample rate should be made as close to the start of a new 24 hour sample period as possible. Multiple sample rate changes within a sample period should be avoided.

The following constraints to holding fish in the sample tank apply:

- a. If the average daily mortality for yearling chinook (in the "A" tank) exceeds 2 percent for three consecutive days then the sampling rate will be returned to the previously-established rate (APPENDIX 1). If the mortality is not reduced to 2 percent or less after two consecutive days at the reduced rate, it will be assumed the problem is not with the sample density and the rate can be increased as necessary.

- b. If the average daily mortality for juvenile sockeye (in the "A" or "B" tanks) exceeds 3 percent for three consecutive days, the sampling rate will be returned to the previously-established rate (APPENDIX 1). If the mortality is not reduced to 3 percent or less after two consecutive days at the reduced rate, it will be assumed the problem is not with sample density and the rate can be increased as necessary.

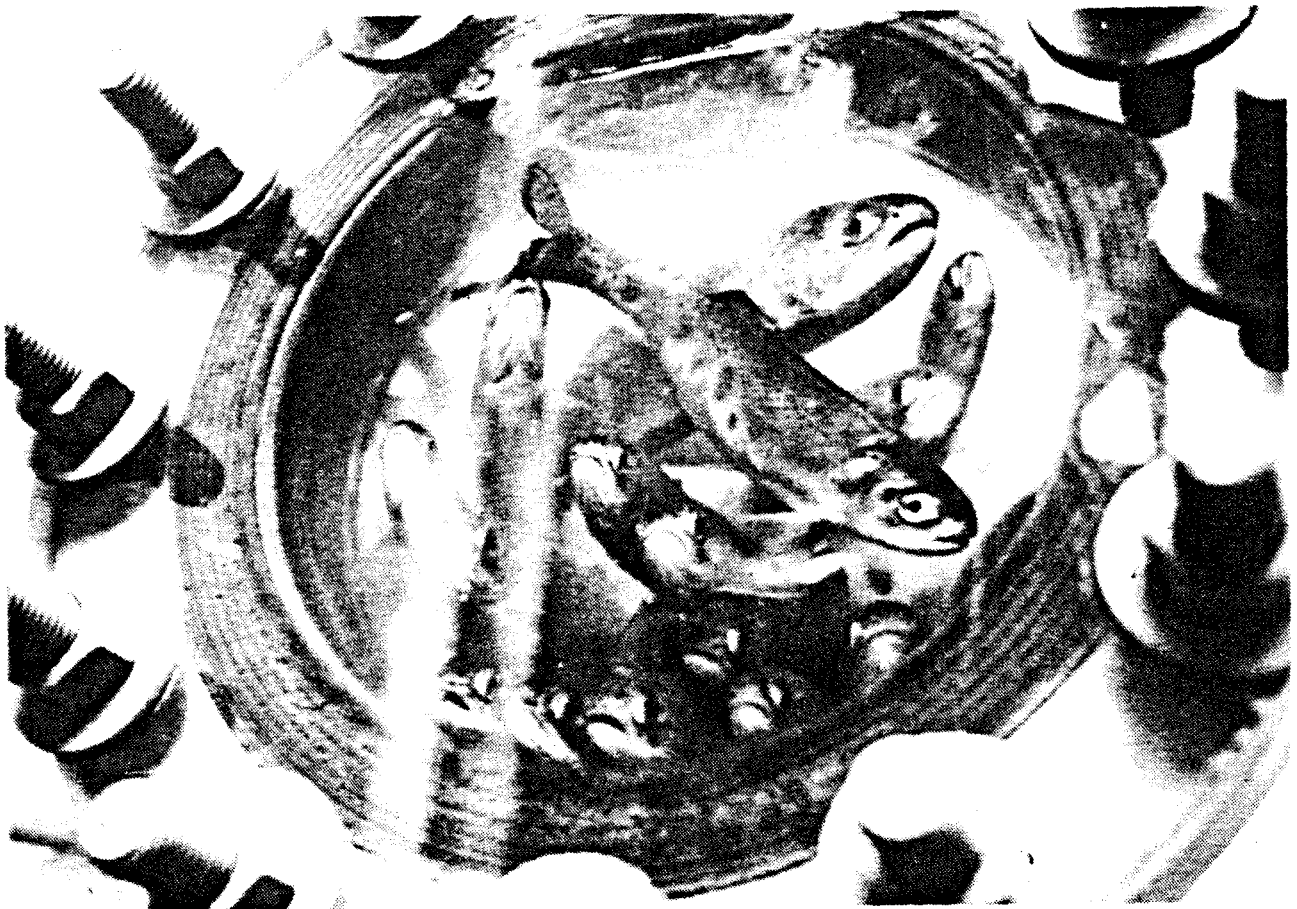
NOAA Technical Memorandum NMFS F/NWR-22



FISH TRANSPORTATION OVERSIGHT TEAM ANNUAL REPORT-FY 1987 TRANSPORT OPERATIONS ON THE SNAKE AND COLUMBIA RIVERS

CHARLES H. KOSKI, STEPHEN W. PETTIT,
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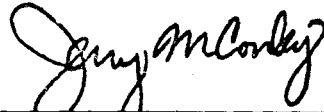
U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service

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